Observations of the Current Structure and Energetics of Gulf Stream Fluctuations

FINAL TECHNICAL REPORT

Office of Naval Research Contract Number N00014-87-K-0233

Submitted by:

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This is the Final Technical Report for the eighteen-month-long Office of Naval Research Contract Number N00014-87-C-0354 to the University of North Carolina at Chapel Hill. Dr. John M. Bane, Jr., Professor in the Marine Sciences Program, was Principal Investigator for the contract period, which began 1 January 1987 and terminated 30 June 1988. Total award for this period was $154,405.00. The internal account number at the University of North Carolina was 5-0-110-3262-35742.

This contract supported research on the physical oceanography of the Gulf Stream. During the contract period, one major cruise was conducted aboard the Research Vessel *Endeavor* as part of the SYNOP Pilot Experiment. This cruise was carried out in order to recover instrument moorings deployed northeast of Cape Hatteras, North Carolina (Figure 1) in late 1986 under previous Office of Naval Research Funding. A complete description of the current meter data sets is given by *Wang and Bane* [1989], a report which was supported partially by this contract. The purpose of the SYNOP Pilot Experiment was to test new field procedures in preparation for the main SYNOP field experiment, which was subsequently conducted under joint Office of Naval Research and National Science Foundation sponsorship.

During the contract period, additional research was undertaken utilizing Gulf Stream data sets collected earlier with ONR funding. This work resulted in the completion of one M.S. thesis and contributed to the publication of five journal articles. Additionally, the contract provided support for one student working towards a Ph. D.

Completed publications for which at least partial support was received from this contract are as follows:

Articles:

Bane, J.M.: The Gulf Stream off the East Coast of the United States. *Chinese J. Oceanol Limnol., 6(4),* pp. 334-342, 1988.

Bane, J.M., and W.K. Dewar: Gulf Stream Bimodality and Variability downstream of the Charleston Bump. *J. Geophys. Res., 93(C6),* pp. 6695-6710, 1988.

Bane, J.M., L.M. O'Keefe and D.R. Watts: Mesoscale Eddies and Submesoscale, Coherent Vortices: Their Existence near and Interactions with the Gulf Stream. In: *Mesoscale/Synoptic Coherent Structures in Geophysical Turbulence,* edited by J.C.J. Nihoul and B.M. Jamart, pp. 501-518, Elsevier Science Publishers, Amsterdam, 1989.

Dewar, W.K., and J.M. Bane: Gulf Stream Dynamics. Part I: Mean Flow Dynamics at 73° W. *J. Phys. Oceanogr., 19(10),* pp. 1558-1573, 1989.

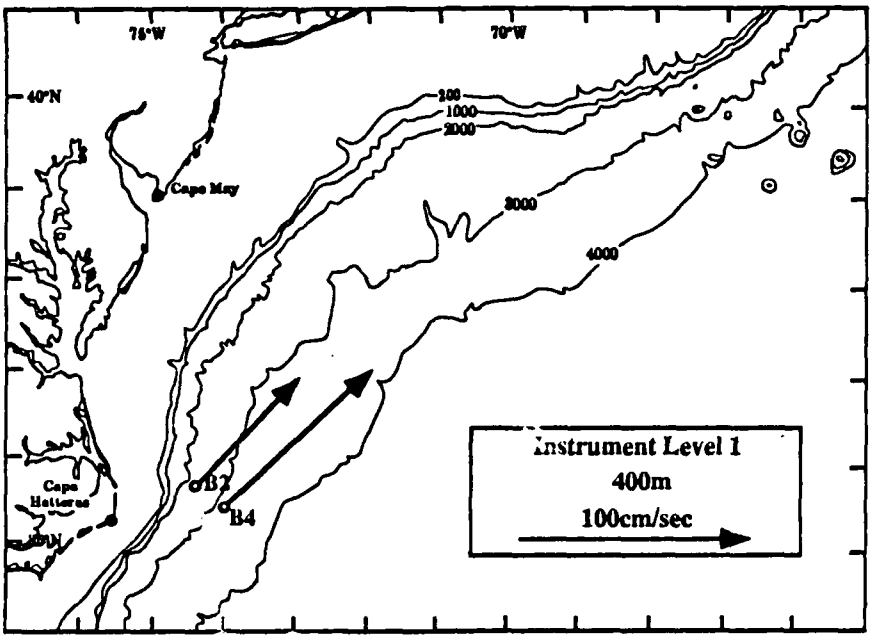
Dewar, W.K., and J.M. Bane: Gulf Stream Dynamics. Part II: Eddy Energetics at 73° W. *J. Phys. Oceanogr., 19(10),* pp. 1574-1587, 1989.

Reports:

Wang, W., and J.M. Bane: The SYNOP Pilot Experiment: Current Meter Data Report, November 1986 to March 1987 Mooring Period. *Univ. North Carolina Report No. CMS-89-2,* 28 pp.

Theses:

Schultz, John R.: Structure and Propagation of Topographic Rossby Waves Northeast of Cape Hatteras North Carolina. M.S. Thesis, Marine Sciences Program, University of North Carolina, 63pp., 1987.



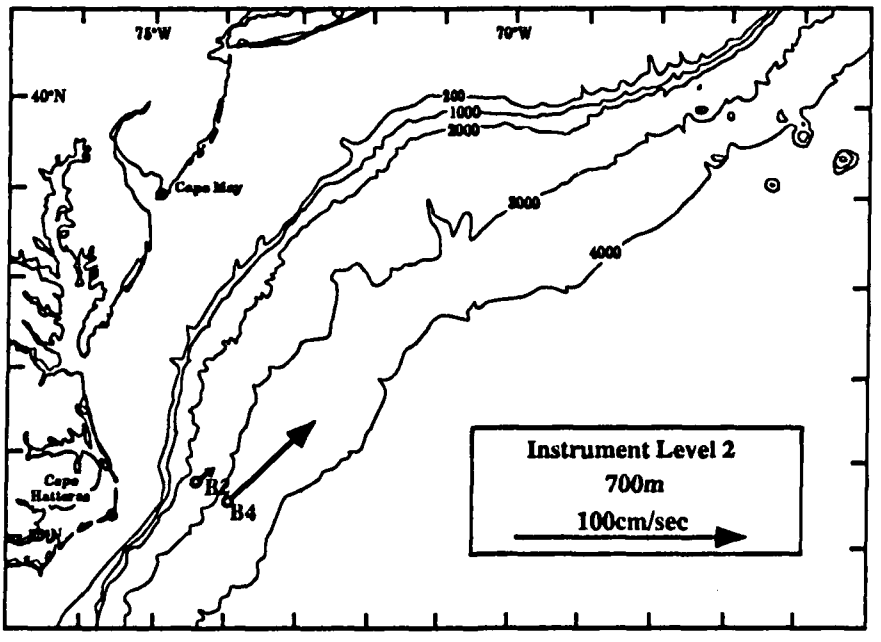
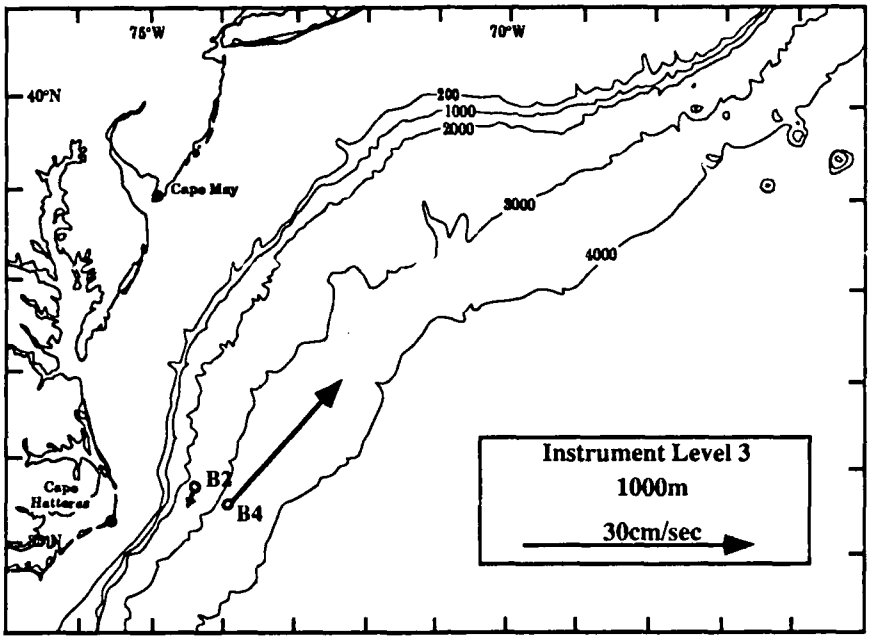


Figure 1. Mean current vectors for the two moorings of the SYNOP Pilot Experiment, conducted northeast of Cape Hatteras from November 1986 to March 1987.



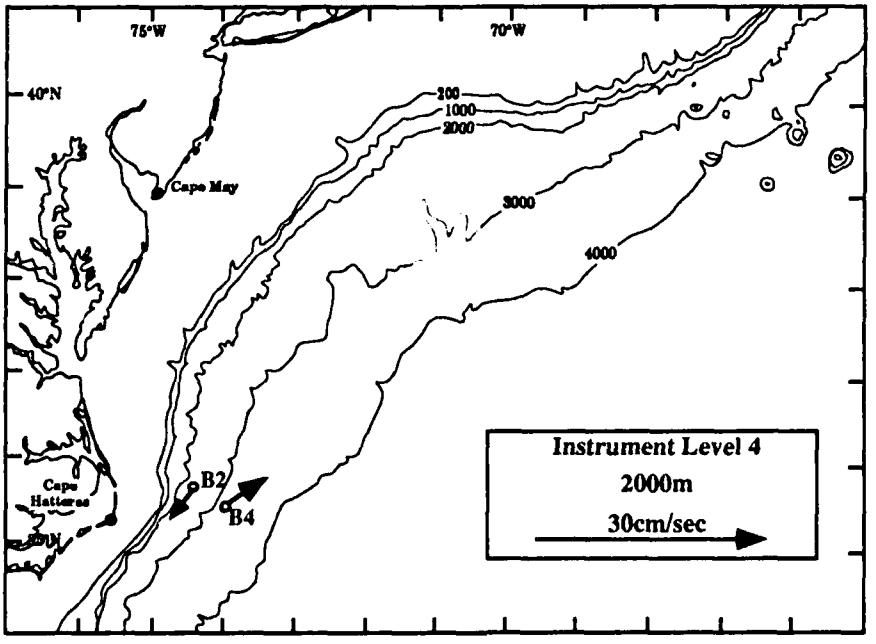


Figure 1. (continued).

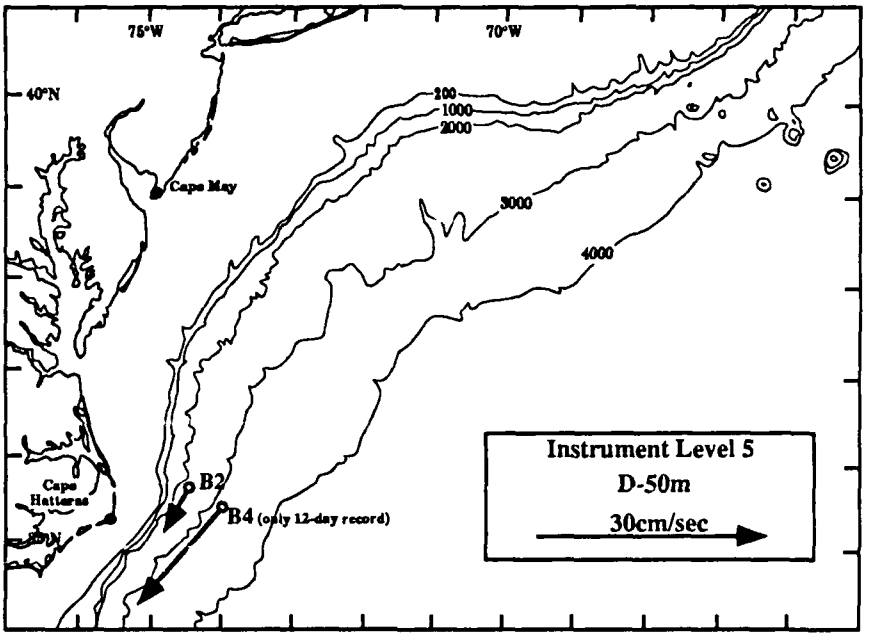


Figure 1. (continued)

STATEMENT "A" per Lt. Comdr. b. Schneider
ONR/Code 1122ML
TELECON 5/14/90 VG